AL.2.1993-155
c. 2

CANADIANA
MAR 29 1993

CONSERVATION AND RECLAMATION GUIDELINES FOR BORROW OPERATIONS

CONSERVATION AND

RECLAMATION GUIDELINES

FOR

BORROW OPERATIONS

ALBERTA ENVIRONMENT
SEPTEMBER 1992

ALBERTA TRANSPORTATION
AND UTILITIES

TABLE OF CONTENTS

1. INTRODUCTION 1

2. DEVELOPMENT AND RECLAMATION APPROVAL 1

3. DEVELOPMENT AND RECLAMATION APPLICATION INFORMATION 3

3.1 Development and Reclamation Approval 3

3.2 Field Supplemental Information 3

4. RECLAMATION GUIDELINES FOR BORROW OPERATIONS 4

4.1 Classifications 4

4.2 Conservation of Topsoil, Subsoil and Overburden 5

4.3 Borrow Excavation 7

4.4 Site Restoration of Landscape Borrow 8

5. SEEDING 9

5.1 General 9

5.2 Surface Preparation 9

5.3 Seeding 10

5.4 Finishing of Seeded Areas 10

5.4.1 Harrowing 10

5.4.2 Seeding, Fertilizing and Mulching 11

5.4.3 Protection of Restored Areas 11

5.5 Clean-up of Stockpile Site 11

5.6 Haul Road Restoration 12

6. ADDITIONAL RECLAMATION GUIDELINES 12

7. GLOSSARY 13

8. APPENDIX "A" 15

9. APPENDIX "B" 18

Digitized by the Internet Archive
in 2015

https://archive.org/details/conservationrecl00albe

CONSERVATION AND RECLAMATION GUIDELINES

THIS DOCUMENT IS APPROVED FOR USE BY STAFF OF ALBERTA TRANSPORTATION AND UTILTIES AND ALBERTA ENVIRONMENT.

ALBERTA TRANSPORTATION
AND UTILITIES

ALBERTA ENVIRONMENT

G.A. BERDAHL
ASSISTANT DEPUTY MINISTER
ENGINEERING
ALBERTA TRANSPORTATION
AND UTILITIES

L. BROCKE
ACTING CHAIRMAN
LAND CONSERVATION AND
RECLAMATION COUNCIL
ALBERTA ENVIRONMENT

L.B. ROOT
ASSISTANT DEPUTY MINISTER
REGIONAL OPERATIONS
ALBERTA TRANSPORTATION
AND UTILITIES

W. SIMON
ASSISTANT DEPUTY MINISTER
FINANCE, ADMINISTRATION AND
LAND RECLAMATION SERVICES
ALBERTA ENVIRONMENT

1. INTRODUCTION

Alberta Transportation and Utilities recognizes the need to reclaim disturbances caused by road construction to an equivalent land capability. The Land Surface Conservation and Reclamation Act and its associated regulations provide:

(i) The guidance for ensuring that all pit operations which involve surface disturbances are planned, operated and reclaimed to an equivalent land capability;

(ii) for the appointment of Reclamation Officers; and

(iii) the requirement for Development and Reclamation (D & R) Approvals.

These guidelines were compiled for use by Alberta Transportation and Utilities staff so that the requirements of the Land Surface Conservation and Reclamation Act will be adhered to and a consistent, province-wide standard will be followed.

2. DEVELOPMENT AND RECLAMATION APPROVAL

The Development and Reclamation Approval is an agreement between the applicant and the Chairman of the Land Conservation and Reclamation Council. The Chairman authorizes the pit operation with the condition that all disturbed areas will be reclaimed to a land capability which is equivalent to that which existed prior to development.

Development and Reclamation Approvals are required for all "large pit developments" on **PRIVATE LAND** in the Province (Private Land is land which does not come under the "Public Lands Act"). In general a "large pit development" means any pit which will disturb an area greater than 2 ha (5 acres) in a given parcel of land.

Development and Reclamation Approvals will be required for any pit which:

(i) is being opened up, operated for the purpose of removing sand, gravel, clay or marl or is being abandoned;

(ii) contains or will contain a plant for the processing of sand, gravel, clay or marl;

(iii) has or will have settling ponds, storage facilities, overburden storage or disposal sites in or in connection with the pit; or

(iv) has or will have any connected access or haul road, railway, telecommunication line, or pipeline incidental to the pit.

For a "small pit development" a (pit which will not be greater than 2 ha (5 acres) in size), a Development and Reclamation Approval is not required. However, the operator or lessee is still responsible for the reclamation of all pits under Part 3 of the Land Surface Conservation and Reclamation Act. Reclamation standards are the same as for the pits that require Development and Reclamation Approval.

After operations in a pit are completed, reclamation is to be undertaken. Where feasible sequential reclamation is recommended. When reclamation is completed to the Councils' requirements, the holder of the Development and Reclamation Approval shall request a Reclamation Certificate from the Chairman of the Land Conservation and Reclamation Council. When the Reclamation Certificate is issued, the responsibility for reclamation ends. The Reclamation Certificate applies to both "large" and "small" pits.

Regular site inspections will be made by the Reclamation Officer to identify any concerns and to ensure the operation complies with the conditions of the Development and Reclamation Approval. Whenever possible, the applicant will be notified of pending site inspections and will receive a copy of the inspection report. Contact with the Reclamation Officer prior to start up is required and regular contact is recommended during operations.

3. DEVELOPMENT AND RECLAMATION APPLICATION INFORMATION

3.1 Development and Reclamation Approval

The Environmental Affairs Section of Contracts Engineering Branch of Alberta Transportation and Utilities will apply for a Development and Reclamation (D & R) Approval at the same time the project is referred to Alberta Environment.

A copy of the Development and Reclamation General Permit Application is included in Appendix "A". This application will include the following information which will become a standard submission:

i) Preferred borrow pit locations as indicated on the mosaic plan-profile;

ii) Sheets detailing borrow information (example in Appendix "A"); and

iii) Typical site cross-section plan for each borrow pit type.

If acceptable, Alberta Environment will then issue a Project Development and Reclamation Approval that will cover all borrow pits on the project. Individual pits in excess of 6 ha (15 acres) will require standard application information. A copy of all Approvals will be forwarded to the Project Manager.

3.2 Field Supplemental Information

The Project Manager is required to submit a Supplemental Information Form to the Reclamation Officer with a copy to the Chairman, Conservation & Reclamation Council for each borrow pit to ensure the requirements of the Land Surface Conservation and Reclamation Act are being followed. The following is required:

i) Development and Reclamation Approval Field Supplemental Information Form. (APPENDIX B).

ii) Site location plan for each pit - Photocopy of mosaic showing:

- exact pit location
- topsoil storage area
- overburden & subsoil storage areas
- access road location

iii) Cross-section schematic plans.

iv) Any unusual conditions requested by local landowners must be submitted in writing and approved by the Reclamation Officer if these conditions alter standard reclamation requirements or equivalent land capability. The Reclamation Officer must also approve any deviation from the normal D & R operating conditions.

This information should be submitted to the Reclamation Officer in sufficient time to allow for proper evaluation and response.

4. RECLAMATION GUIDELINES FOR BORROW OPERATIONS

4.1 Classifications

a) LANDSCAPE BORROW

The following conditions apply:

i) The excavated area will be returned to the equivalent land capability regardless of depth of excavation;

ii) High areas of land are removed to allow for more efficient field cultivation;

iii) Backslopes are not steeper than a 5:1 slope on cultivated land or a 4:1 slope on other land regardless of final use; and

iv) Topsoil and subsoil or plant growth medium will be salvaged and respread over the excavated area in order to support plant growth.

b) DUGOUT BORROW

The following conditions apply:

i) The excavated area will not be returned to original land use and should be located and designed to hold water where soil conditions allow. Location and nature of dugout borrows should be discussed with the landowner and Reclamation Officer. Drainage information is required to confirm the dugout design and function.

ii) Excavation shall exceed 2m and the sideslopes shall be no steeper than a 2:1 slope. For extremely deep borrow (>5m) a two phase (stepped or terraced) slope may be required.

(iii) If the dugout borrow design is unsuccessful in holding water, as a result of unexpected site conditions, the landscape borrow conditions are to be applied, with consideration for alterations on a site specific basis, subject to the approval of the reclamation officer.

c) OTHER BORROW

The following conditions apply:

i) Excavated area may have a specific end-use assigned to it.

eg. Fish Pond, other industrial use.

4.2 Conservation of Topsoil, Subsoil and Overburden

For reclamation purposes, topsoil, subsoil and overburden should be referred to by the following definitions:

1. **Topsoil:** Means the uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils, and normally ranging in depth from 5 cm to 45 cm.

2. **Subsoil:** The portion of soil material that lies immediately beneath the topsoil extending to root depth. In exceptional cases subsoil may be up to 1.5m in depth.

3. **Overburden:** That portion of soil material that lies between the subsoil and the material to be utilized for road construction purposes.

The conservation and replacement of topsoil and subsoil materials is essential. Topsoil and subsoil must be salvaged on all borrow areas. Topsoil and subsoil must be salvaged separately, stockpiled in a safe and accessible location as approved by the Reclamation Officer and replaced in the proper sequence over the recontoured borrow area.

In some areas of the province the topsoil can consist of two distinct layers. The blacker layer shall be stockpiled separately from the lower brownish layer. The Reclamation Officer should be consulted to determine if separate salvage is required.

The operator shall carefully control operations to ensure maximum salvage of the topsoil without contaminating it with underlying material.

Salvage of subsoil is required to ensure equivalent soil capability of the reclaimed soil on agricultural lands.

Salvage of topsoil, subsoil and overburden materials under frozen conditions requires an amendment to the approval.

Topsoil stockpiles can only be placed on topsoil. Subsoil stockpiles can only be placed on subsoil material. Overburden can only be placed on overburden material stockpiles. There should be a minimum separation of 1 m between stockpiles.

On borrow sites where little or no topsoil exists, a 10 - 15 cm layer of surface material is to be salvaged as recommended by the Reclamation Officer.

In those agricultural areas where trees have covered the borrow area, the department will replace the salvaged soil and leave the area in a condition as if the farmer had worked the area for 2 years in a row; i.e. removed the trees, burned the windrows, broken the ground and picked roots and rocks for the first time.

Topsoil from haul roads will be stripped and stockpiled for use in haul road reclamation.

The operator must maintain erosion and drainage control in the vicinity of all stockpiles, and ensure that surface drainage does not create problems that may affect adjacent lands or make reclamation more difficult.

Where wind erosion may affect stockpiles, seeding of the stockpiles or use of a soil stabilizer should be considered. When topsoil is to be stockpiled for more than 4 months, use of a soil stabilizer or seeding is required to control weeds and to minimize wind and water erosion.

4.3 Borrow Excavation

Undisturbed buffer zones are required to protect adjacent land and permanent structures from adverse effects of the excavation activities. Normal buffer zones for property boundaries, road allowances and permanent structures are 3m or equal to the depth of excavation whichever is greater. Undisturbed buffer zone requirements with respect to property boundaries or utility rights-of-way are required to comply with land use development by-laws.

Extended buffers should be implemented where local conditions dictate. Dugout borrow pits have a required setback of 40 m from the right-of-way or 70 m from the highway centreline; whichever is greater. For watercourses or waterbodies a minimum 30 m wide buffer may be required.

Drainage control within and adjacent to the pit must be acceptable to the Reclamation Officer and the Water Resources Administration Division.

On completion of the work, the borrow area shall be trimmed and left in a neat and uniform condition, prior to restoration.

For cultivated areas, landscape pits are to be reclaimed with slopes no steeper than 5:1 along the pit perimeter. Flatter slopes are preferable when practical. For other land, regardless of final use, the final pit slope will be no steeper than 4:1 or as agreed to with the landowner and Reclamation Officer as dictated by final land use and consistent with good engineering practice.

4.4 Site Restoration of Landscape Borrows

Upon completion of excavation operations in the borrow area the operator shall contour and replace all soil levels uniformly in lifts in the reverse order that they were removed. The work shall be done during favourable weather conditions and on ground free of frost, snow, ice or standing water. Scarification of the soil layer will be required whenever compaction will cause reduction in soil capability.

(i) Where compaction of the underlying soil or dense material is encountered, scarification of the entire area to a minimum depth of 0.3 m is required or as directed by the Reclamation Officer. Where large clay clumps are prevalent, discing shall be performed following scarification;

(ii) Where waste material or overburden has been salvaged, it is to be redistributed uniformly over the entire area. This material is to be disced as required and rocks removed to the extent that rock content is comparable to adjacent undisturbed areas.

(iii) Where subsoil has been salvaged, it is to be redistributed evenly over the entire area, disced and rocks removed as in **(ii)** above.

(iv) Topsoil shall be evenly redistributed over the entire area, the area contoured and rocks removed as in **(ii)** above.

In areas where dry soils are encountered discing and harrowing may destroy soil structure and lead to loss through wind erosion. When these types of areas are encountered, the Reclamation Officer shall be consulted to determine alternative procedures for site restoration.

For those areas of the province where the topsoil, subsoil and overburden are rocky tills, then rock picking will be required to ensure rock content of the reclaimed land does not exceed the rock content prior to disturbance. If rock content prior to disturbance is not known, then comparison to adjoining land will be made.

Upon completion of a successful design, on a dugout borrow, excess topsoil not required to reclaim the perimeter areas may be redistributed over adjacent cultivated fields by pre-arrangement with the landowner.

The department will reclaim the excavation in accordance with the reclamation guidelines and D & R Approval unless otherwise approved. Any agreements with the landowner to change the equivalent land capability shall be in writing and a copy provided with the application for D & R Approval to the Reclamation Officer.

5. SEEDING

5.1 General

Work will consist of: preparing the area to be seeded; applying the seed and fertilizer; and harrowing of the seeded area or protecting various seeded areas by means of a mulch cover, as directed by the Engineer.

5.2 Surface Preparation

Areas to be seeded shall be fine graded to a uniform surface and be loose to plow depth at the time of seeding.

The surface shall be harrowed and free of debris as per Section 4.4 (iv). Where mulch is to be applied, the surface must be sufficiently smooth to allow a uniform covering of seed and mulch material. Alternate seeding preparation methods may be necessary for dry soils.

The work shall be done during favourable weather conditions and on ground free of frost, snow, ice or standing water.

5.3 Seeding

All disturbed areas resulting in exposed soils within borrow areas and haul roads shall be seeded.

Seed shall consist of a species mixture compatible to adjacent areas unless otherwise requested by the landowner to meet his requirements. Alternate seeding methods may be required for dry soils.

5.4 Finishing of Seeded Areas

The Project Manager will designate which areas are to be seeded, fertilized and harrowed, and those areas to be seeded, fertilized and mulched. Generally, those areas which in the opinion of the Engineer are impractical to harrow due to the terrain characteristics, will be designated for seeding, fertilizing and mulching but only during favourable weather conditions.

5.4.1 Harrowing

All areas designated for seeding, other than those designated for mulching in addition to the seed and fertilizer application, must be harrowed upon completion of seeding in order to incorporate the seed and fertilizer into the soil. Special methods may be necessary for dry soils.

No area in excess of that which can be harrowed on the same day that it is sown shall receive the seed and fertilizer application.

5.4.2 Seeding, Fertilizing and Mulching

Where a mulching application has been designated, seed, fertilizer and mulch shall be uniformly mixed and applied over the area. The equipment used shall be an approved type of hydro seeder which utilizes water as the carrying medium, and maintains a continuous agitator action which will keep the seed, fertilizer and mulch mixed in uniform distribution until pumped from the tank.

The pump pressure must maintain a continuous non-fluctuating stream of solution. Alternate seeding methods may be required for dry soils. Small areas may be seeded by hand.

5.4.3 Protection of Restored Areas

Special care must be taken to prevent soil and land degradation by continued grading or other construction operations upon completion of reclamation and abandonment. All areas disturbed by any cause must be reclaimed. All areas failing to show a self-sustaining uniform stand of vegetation after one growing season following initial seeding must be reseeded, fertilized and remulched. Weed control may be required.
Where necessary, temporary fences along borrow area perimeters may be required to control livestock or to restrict entry until a uniform stand of vegetation is attained.

5.5 Clean-up of Stockpile Site

Upon depletion of the topsoil, subsoil and overburden stockpiles these sites shall be levelled, scarified, topsoil replaced and seeded. Debris and material unsuitable for use in reclamation shall be disposed of in a manner satisfactory to the Project Manager and the Reclamation Officer.

5.6 Haul Road Restoration

Upon completion of operations any temporary haul roads must be reclaimed. This will consist of roadbed removal, scarification to eliminate compaction and then a similar operation as in Section 4.4. Surface drainage patterns shall be re-established.

6. ADDITIONAL RECLAMATION GUIDELINES

For more complex operations, additional reclamation guidelines may be applied where abnormal site conditions create special concerns. Examples of complex operations include pits:

- Located along valley breaks;
- located along major watercourses;
- which will mine below the watertable; or
- which occur on range land.

The Project Manager should discuss complex operations with the Reclamation Officer.

GLOSSARY

CONSERVATION	-	Means the planning, management and implementation of an activity with the objective of protecting the essential physical, chemical, and biological characteristics of land against degradation.
EQUIVALENT LAND CAPABILITY	-	Means the ability of the land to support various land uses after reclamation, similar to the ability that existed prior to any activity being conducted on the land, but that the ability to support individual land uses will not necessarily be identical after reclamation.
PLANT GROWTH MEDIUM	-	Normally considered to be the top layer of material which does not meet the definition of topsoil. May include duff, moss, leaves, sod, etc. in wooded areas.
PLOW DEPTH	-	Normally the depth at which the material would be disced and scarified prior to seeding. Depends upon depth of topsoil. Normally does not exceed 30 cm.
RECLAMATION	-	Means the planning, management, and implementation of an activity with the objective of ensuring stable, non-hazardous, non-erodible favourably drained soil conditions, and land capability which is equivalent to conditions prior to the activity
RECLAMATION OF LAND	-	Means all practicable and reasonable methods of designing and conducting an activity to ensure: (i) stable, non-hazardous, non-erodible, favourable drained soil conditions, and (ii) equivalent land capability upon abandonment.
RECLAMATION SUITABLE MATERIAL	-	Any and all soil material capable of supporting vegetative growth. This may include topsoil, subsoil and overburden.

SOIL CAPABILITY - Focuses on the nature and degree of limitations imposed by the physical characteristics of a land unit for a certain use (Smit et al 1983).

WASTE - Digging, hauling and dumping of valueless or surplus overburden material to get it out of the way; or the valueless or surplus overburden material itself.

APPENDIX "A"

Alberta

TRANSPORTATION
AND UTILITIES

General Permit

APPLICATION FOR CONSERVATION AND RECLAMATION APPROVAL

APPLICANT'S NAME: ____________________

ADDRESS: ____________________

____

____

CITY: ____________ PROVINCE: ____________ POSTAL CODE: ____________

TELEPHONE: ____________________

I/WE HEREBY MAKE APPLICATION FOR AUTHORITY TO DEVELOP BORROW PITS SHOWN ON THE ATTACHED PHOTO MOSAIC ALIGNMENT DRAWINGS AND TITLED AS PROJECT:

____

____

UNDER SAND, GRAVEL, CLAY, AND MARL SURFACE OPERATIONS REGULATION 228/82

NAME OF DISTRICT TRANSPORTATION ENGINEER/
PROJECT MANAGER:

____

ADDRESS: ____________________

____

____

____

TELEPHONE: ____________________

DATE: ____________________

APPLICANT'S SIGNATURE: ____________________

CONSERVATION AND RECLAMATION APPROVAL

BORROW INFORMATION

PROJECT: ______________________

FILE: ______________________

DESCRIPTION: ______________________

DISTRICT: ______________________

B.P. NO.	Station	LT OR RT	TYPE OF BORROW PIT			DIMENSIONS			HAUL ROAD	TOTAL DISTURBED AREA	SOIL DEPTHS IF AVAILABLE		SOIL TEST		COMMENTS
			L/S	D/O	B/A	LENGTH	WIDTH	DEPTH	M	Ha	TOPSOIL CENTIMETRES	SUBSOIL CENTIMETRES	Y	N	

* L/S = Landscape
* D/O = Dugout
* B/A = Backslope Agreement

APPENDIX "B"

ALBERTA TRANSPORTATION
AND UTILITIES

DATE:____________________

CONSERVATION AND RECLAMATION APPROVAL
FIELD SUPPLEMENT

D & R APPROVAL NO: __________________________________

B.P. NO:____________________ LOCATION: ____________________________

PROJECT: ______________________________________

LSD	SECTION	TWP	RANGE	MERIDIAN

DEPTH OF TOPSOIL __________
DEPTH OF SUBSOIL __________
DEPTH OF OVERBURDEN __________
DEPTH OF EXCAVATION __________
DEPTH OF GROUNDWATER __________
LENGTH OF ACCESS ROAD __________
(DO NOT INCLUDE R/A)
BORROW PIT AGREEMENT Y/N
ABLE TO HOLD WATER Y/N
(IF BORROW PIT AGREEMENT CHANGES EQUIVALENT SOIL CAPABILITY, ATTACH AGREEMENT)

NAME & ADDRESS OF REGISTERED OWNER

PRESENT LAND USE:

CULTIVATION ☐
PASTURE ☐
GRASSLAND ☐
BRUSH LAND ☐
POPLAR ☐
PINE/SPRUCE ☐

FINAL LAND USE:

CULTIVATION ☐
PASTURE ☐
GRASSLAND ☐
BRUSH LAND ☐
TREED ☐

ATTACH PHOTOCOPY OF MOSAIC SHOWING; B.P. LOCATION, HAUL ROADS, TOPSOIL, STORAGE AREA, SUBSOIL AND OVERBURDEN STORAGE AREAS.

ATTACH CROSS-SECTION DRAWINGS.

EARTH BORROW PIT

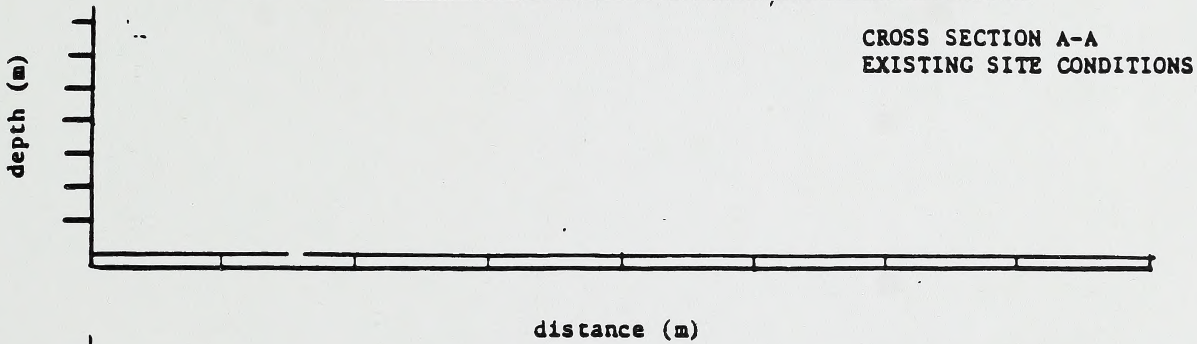
EXISTING AND RECLAIMED SITE CROSS-SECTION DRAWINGS

PROJECT________________ FROM________________ TO________________

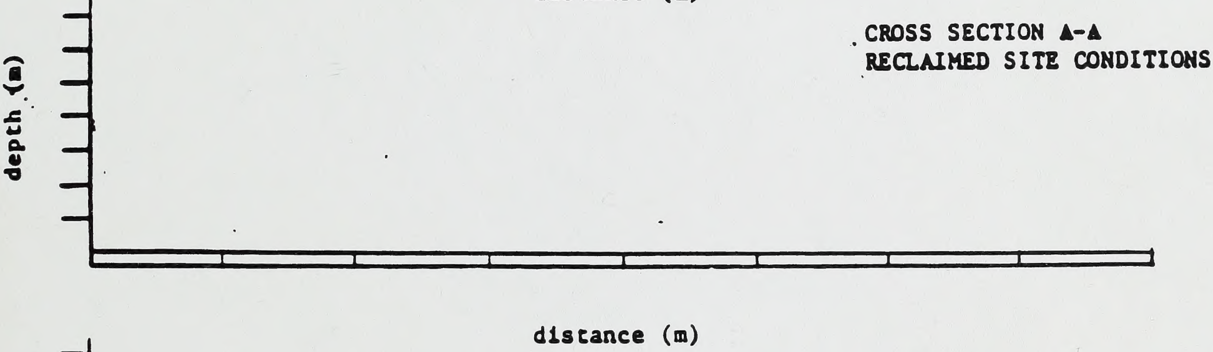
PIT NO.____ LOCATION____ 1/4 SEC____ TWP_____ RGE____ W_____

OWNER'S NAME: ____

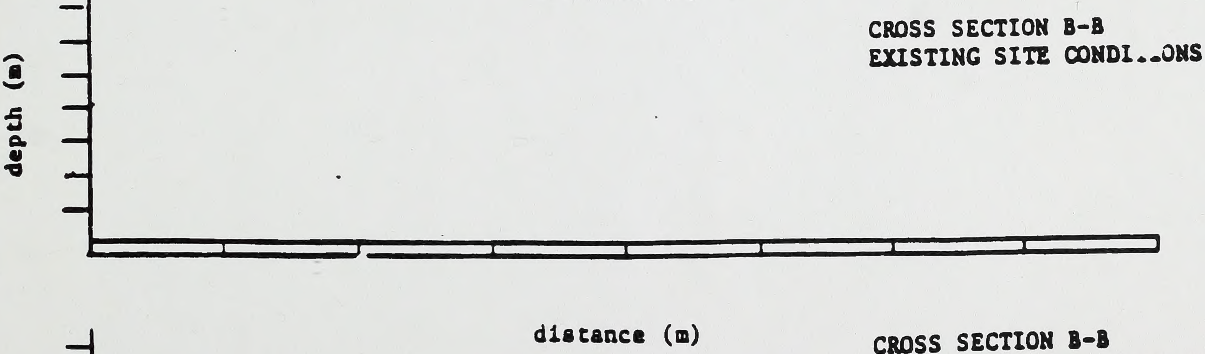
D & R APPROVAL: ____



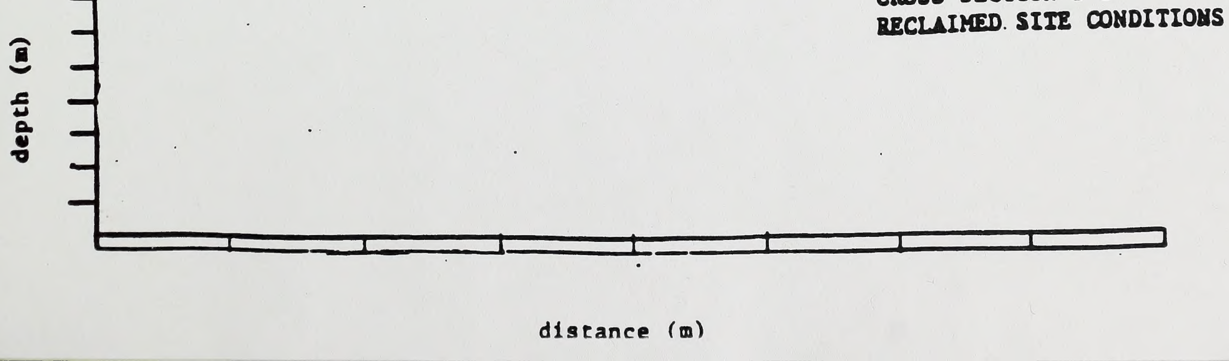
CROSS SECTION A-A
EXISTING SITE CONDITIONS



CROSS SECTION A-A
RECLAIMED SITE CONDITIONS



CROSS SECTION B-B
EXISTING SITE CONDI..ONS



CROSS SECTION B-B
RECLAIMED SITE CONDITIONS

N.L.C./B.N.C.
3 3286 50150 1098